

CS 585 Image and Video Computing
Project Progress Report #1
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I. Goal: Classify and count texture-less objects on reflective backgrounds.

I am using as my test data, stainless steel flatware such as forks, knives and spoons on a stainless steel, reflective background.

II. The Plan

1. Detect and use object boundaries.
2. Create descriptors from object boundaries using Fourier based approach to describe the objects as a linear sum of trigonometric functions $A \sin(B \theta)$. Save the A, and B coefficients to a database. Or fit cubic splines to the object boundaries. Also save other information like moments.
3. Create a machine-learning classifier like AdaBoost.
4. Create a confusion matrix by having a human do the actual count to get ground truth and compare the numbers to the automated results using a confusion matrix.
5. Iterate by refining the image processing, boundary detection and descriptor creation algorithms. Continue to improve classification scheme.

III. Experiments and Progress

1. In Assignment 4, I applied SIFT as a feature detector to the flatware on both a plain and reflective background. The algorithm was a big fail due to the aperture problem.

2. Currently, I am using CANNY and varying thresholds. Reflections on both the flatware and the background are a major problem. I am going to experiment with erosion and dilation next to see if I can clean up the edges. I am also looking at this material http://www.cs.cmu.edu/~stein/nsf_webpage/.

On the next page are two images that demonstrate the reflection problem: the first was shot on a non-reflective background and the second on a reflection background. If I raise the threshold large enough to begin eliminating reflections, I also eliminate boundary information.

